

CLAIMS

1. A set of virtual machine instructions suitable for execution in a virtual
5 machine, the set of virtual machine instructions representing a number of
corresponding Java Bytecode executable instructions that are also suitable for
execution in the virtual machine,
 wherein the set of the virtual machine instructions consists of a number
of virtual machine instructions which is less than the number of the
10 corresponding Java Bytecode executable instructions, and
 wherein every one of the corresponding Java Bytecode executable
instructions can be represented by at least one of the virtual machine
instructions in the virtual machine instruction set.
- 15 2. A set of virtual machine instructions as recited in claim 1, wherein the
number of virtual machine instructions is about 30 to 50 percent of the
number of the corresponding Java Bytecode executable instructions.
3. A set of virtual machine instructions as recited in claim 1, wherein two or
20 more Java Bytecode executable instructions are represented by one virtual
machine instruction.
4. A set of virtual machine instructions as recited in claim 1, wherein at least
one of the Java Bytecode executable instructions can be represented by the
25 two or more virtual machine instructions.
5. A set of virtual machine instructions as recited in claim 4, wherein the least
one Java Bytecode executable instruction is a conditional data flow operation.
- 30 6. A set of virtual machine instructions as recited in claim 1, wherein the set
includes at least one virtual machine instruction that represents at least one

operation that cannot be represented by any one of the Java Bytecode executable instructions.

7. A set of virtual machine instructions as recited in claim 6, wherein the at
5 least one virtual machine instruction represents a duplicate stack operation.

8. A set of virtual machine instructions as recited in claim 1, wherein at least
one virtual machine instruction is internally represented in the virtual machine
by a pair of streams.

10

9. A set of virtual machine instructions as recited in claim 8, wherein the pair
of streams includes a code stream and a data stream,
wherein the code stream is suitable for containing a code portion of the
at least one virtual machine instruction,
15 and the data stream is suitable for containing a data portion of the at
least one virtual machine instruction.

15

10. A method of converting a set of Java Bytecode executable instructions into
a set of executable virtual machine instructions, the method comprising:
20 receiving one or more bytes representing a Java Bytecode instruction
suitable for execution in a virtual machine;
selecting a corresponding virtual machine instruction, the
corresponding virtual machine instruction suitable for execution in the virtual
machine and representing one or more operations that can be performed when
25 the Java Bytecode instruction is executed; and
wherein the virtual machine instruction can represent at least two or
more Java Bytecode executable instructions such that operations that can be
performed by executing the at least two or more Java Bytecode executable
instructions can be performed by execution of the virtual machine instruction.

30

11. A method as recited in claim 10, wherein the method further comprises:
loading the virtual machine instruction into the virtual machine as an
internal representation with a pair of streams.

5 12. A method as recited in claim 10, wherein the pair of streams includes a
code stream and a data stream, the code stream suitable for containing a code
portion of the at least one virtual machine instruction, and the data stream
suitable for containing a data portion of the at least one virtual machine
instruction.

10

13. A Java Bytecode instruction translator operating to convert a set of Java
Bytecode executable instructions suitable for execution on a virtual machine
into a set of corresponding executable virtual machine instructions,

15 wherein the corresponding virtual machine instructions are also
suitable for execution in the virtual machine and represent operations that can
be performed by execution of a number of corresponding Java Bytecode
instructions, and

20 wherein the corresponding set of the virtual machine instructions
consists of a number of virtual machine instructions that is less than the
number of the corresponding Java Bytecode executable instructions.

14. A Java Bytecode instruction translator as recited in claim 13, wherein two
or more Java Bytecode executable instructions are represented by one virtual
machine instruction.

25

15. A Java Bytecode instruction translator as recited in claim 13, wherein at
least one of the Java Bytecode executable instructions can be represented by
two or more virtual machine instructions.

16. A Java Bytecode instruction translator as recited in claim 15, wherein the least one Java Bytecode executable instruction is a conditional data flow operation.

5 17. A Java Bytecode instruction translator as recited in claim 13, wherein the set includes at least one virtual machine instruction that represents operations that cannot be represented by any one of the Java Bytecode executable instructions.

10 18. A Java Bytecode instruction translator as recited in claim 17, wherein the at least one virtual machine instruction represents a duplicate stack operation.

15 19. A Java Bytecode instruction translator as recited in claim 13, wherein at least one virtual machine instruction is internally represented in the virtual machine by a pair of streams.

20 20. A Java Bytecode instruction translator as recited in claim 19, wherein the pair of streams includes a code stream and a data stream,
wherein the code stream is suitable for containing a code portion of the
at least one virtual machine instruction, and
wherein the data stream is suitable for containing a data portion of the
at least one virtual machine instruction.

25